

**Global Crossing International Conference &
Atlantic Crossing Project Update Meeting**

April 6-8, 1998, Hotel Arts, Barcelona

Submarine Cable Outlook '98TM

**Megatrends to Megademand:
A Look at Future Demand Scenarios**

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T Soja & Associates -- Global Telecom Market Analysis

Founded: October 1997

Focus: Independent market analysis of fiberoptic telecom cable systems and markets

Emphasis: SUBMARINE CABLE NETWORKS WORLDWIDE

Principals: Thomas A. Soja, Managing Director

John Manock, Director Information Services

Combined 17 years' experience in
fiberoptics and telecom market research

Recent Projects (past 15 months)

Atlantic Crossing (AC-1)

Global Crossing

Afrilink

Siemens AG

HIAM / Western Hemisphere

GST International

APII / TPCN

Hansol Telecom

Global West

Global Photon Syst's Inc

Mid-Atlantic Crossing (MAC-1)

Global Crossing

Pacific Crossing (PC-1)

**Global Crossing &
Marubeni**

Market Environment / Trends Outline

- **The Technology-Bandwidth Paradox**
- **Dramatically Decreasing Circuit Costs**
- **Submarine Cables Circuit Demand Drivers**
- **Market Status & Opportunities**
- **Innovations in Ownership Structure, Pricing & Terms**
- **Forecasting Growth**

Continuous Cycle Driving Bandwidth Demand

*Technology Driving Costs Lower, Creating Opportunities
& Enabling New Applications*

**1. Technology Increases
Bandwidth Available per \$**
(and also ICT* Processing power per \$)

**2. Cost of Bandwidth
Decreases in Market**

**Greater Demand for
Service and
Bandwidth**

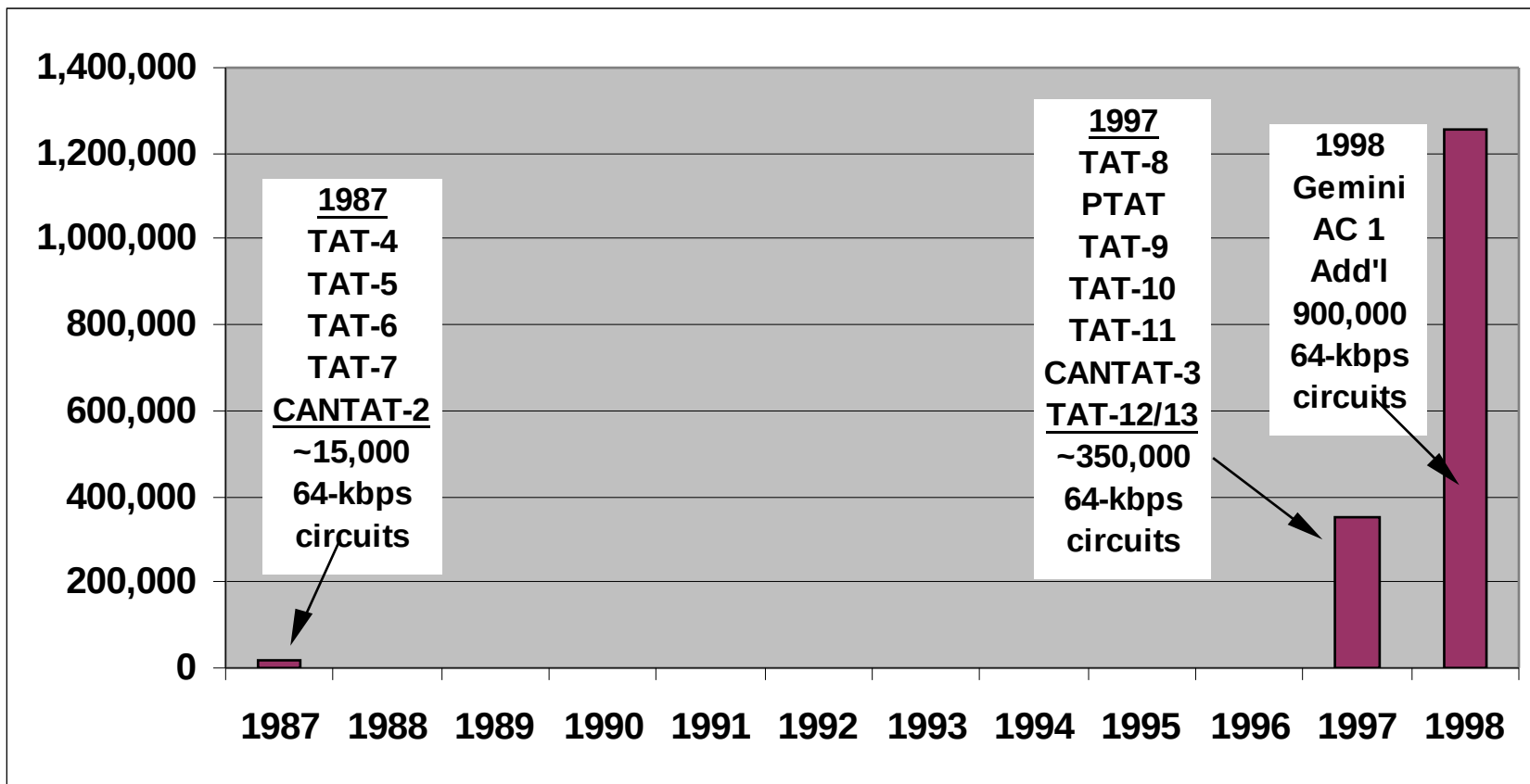
**3. Entry of New Carriers,
Innovative Applications,
Product / Service Extensions**

**4. More Users,
More Applications,
More Opportunities &
Places to use ICT***

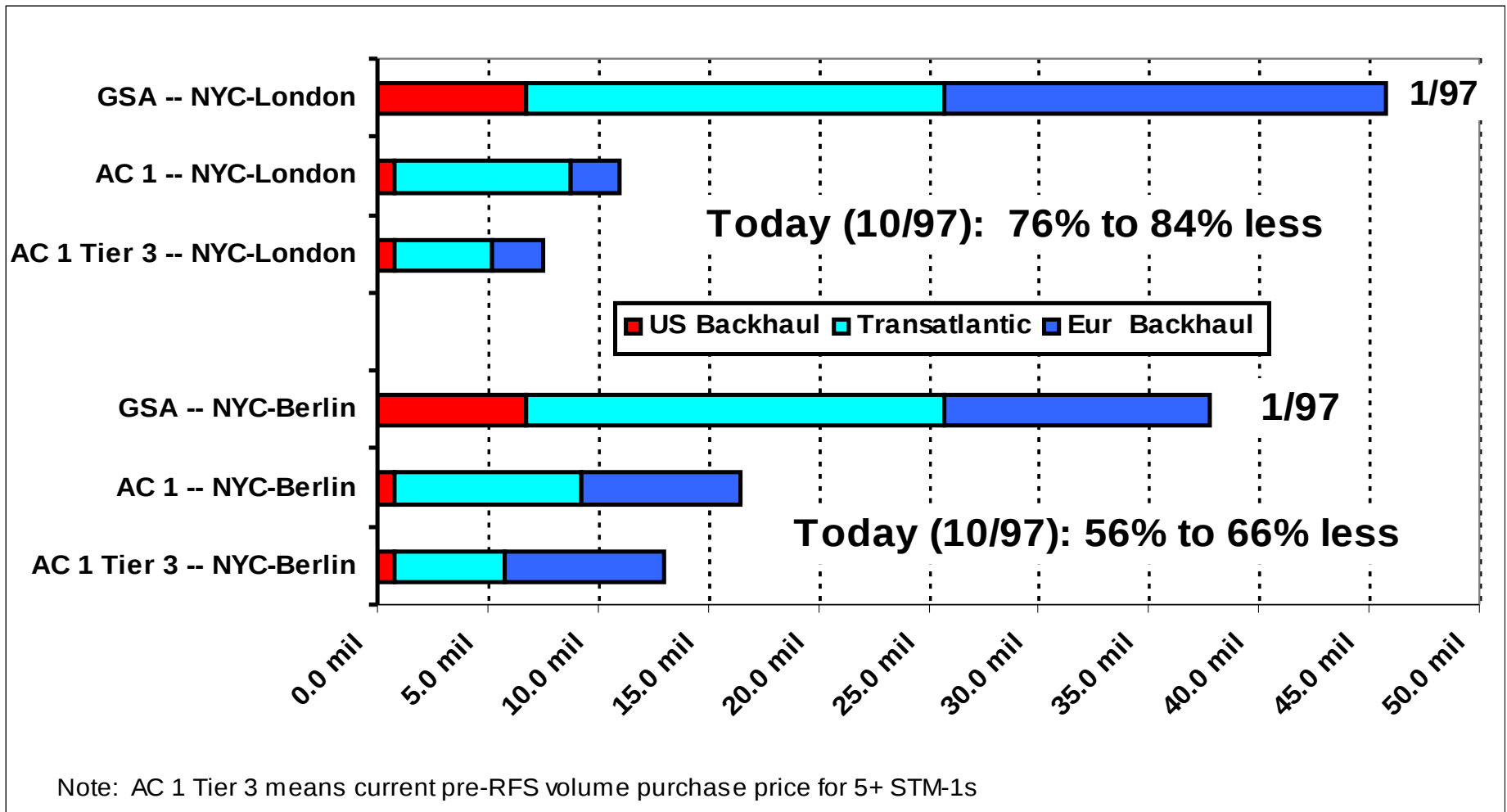
* ICT = Integrated Computer Telephony

Technology Enables Increase in Bandwidth

Number of Voice Circuits Across The Northern Atlantic Region, 1987 to 1998



Comparison of Transatlantic and City-to-City Costs



Driver: Growth in Carriers Worldwide Due to Telecoms Deregulation & Market Liberalization

- More than 700 international telcos worldwide
- 400 international carriers in US alone
- 80 licensed carriers in UK

RESULT:

- Proliferation of international carriers
 - TAT-12/13: 84 signatories to C&MA
 - SEA-ME-WE-3: 82 signatories to C&MA
 - TPC-5CN: 78 signatoires to C&MA

Innovation in Ownership Structure

- Consortium TATs, TPCs, Americas
- Sponsored Cables PTAT, NPC, FLAG
Gemini
- Investor Cables Global Crossing, Neptune
- Two-Tier Consortium China-US
- Sponsored Consortium Project Oxygen

Innovation in Pricing & Terms

- Minimum Investment Unit (MIU)
 - E-1 (2-Mbps)
 - DS3 (45 Mbps)
 - STM-1 (155.5 Mbps)
 - 320 Gbps
- Capacity Route Commitments
 - Point-to-point (half-circuits shared with defined correspondents)
 - Whole circuits
 - MIU-point schemes
 - Re-assignable MIU-points
 - Ubiquitous access

Driver: Bandwidth Requirements = Users X Applications

- Number of Host Computers
 - CAGR ~ 90% per year 1991 to 1997
 - Projections to exceed 120 million by 2000
(Up from 1.3 million in 1993)
- Number of users increasing dramatically in all markets worldwide
 - Number of users to exceed 200 million by 2000

Driver: Bandwidth Requirements = Users X Applications

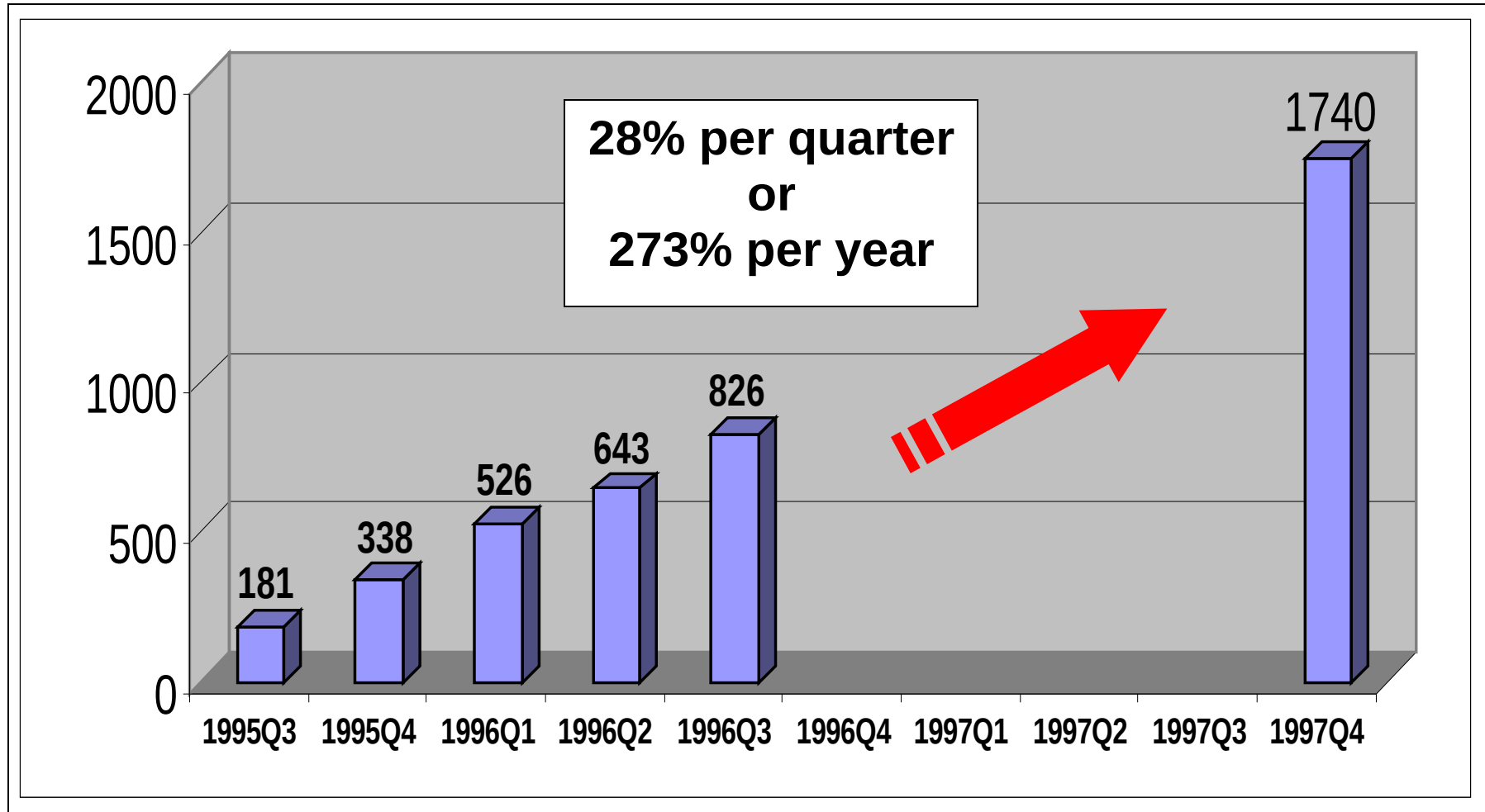
(continued)

- Applications

- Internet banking and commerce
- Advanced search agents and "push technology"
- Internet entertainment: games, gambling, adventures, story-telling
- Infotainment
- Advertising
- Net telephony--an enabler of innovative new services: call center support, shared whiteboard, collaborative work conferencing, find-me, follow-me, never-busy fax, multimedia mailbox
- Image and video clip attachments to e-mail
- Audio and video streaming
- Net meetings and collaborative work

Videoconferencing

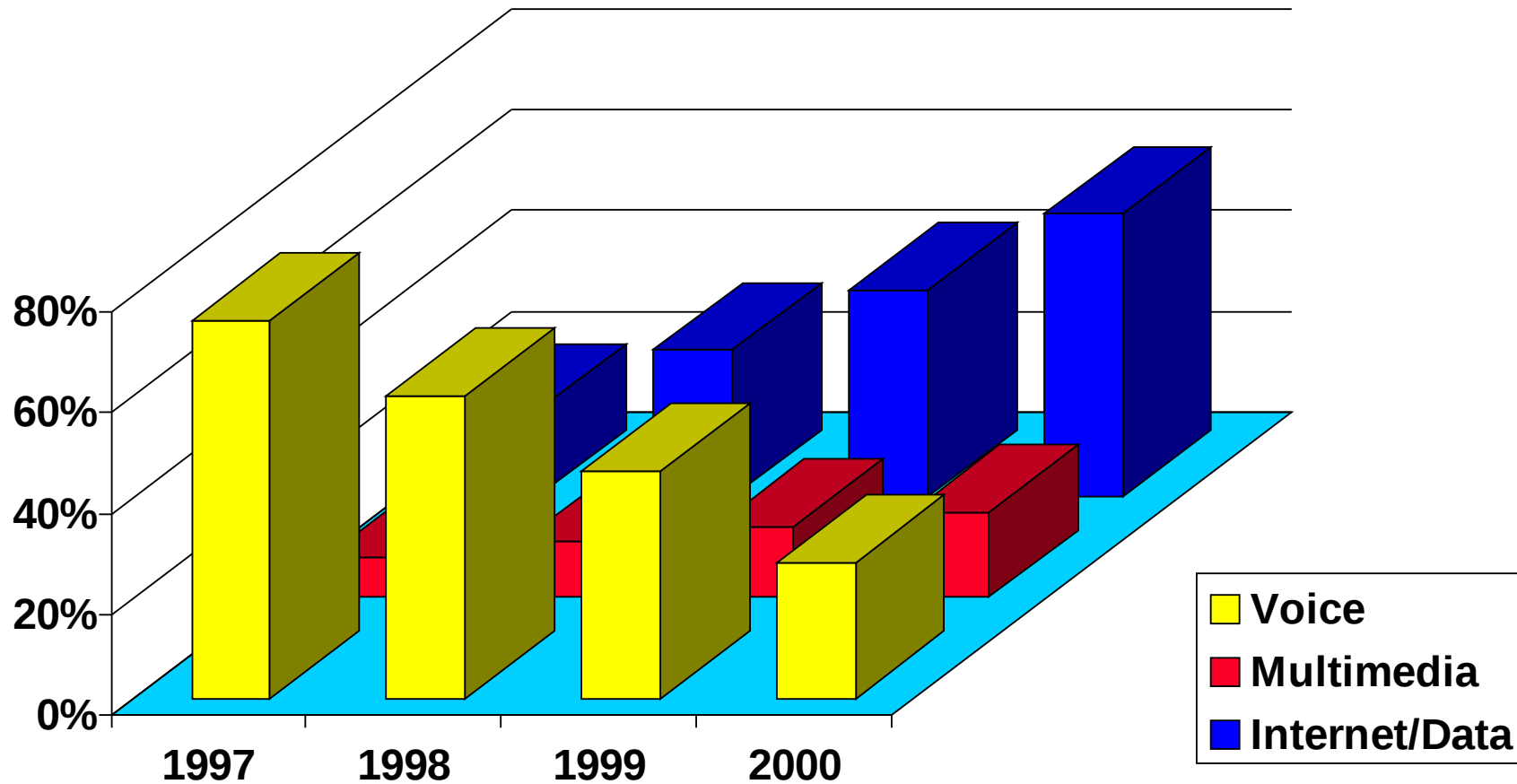
Expanding Volume of MCI's Internet



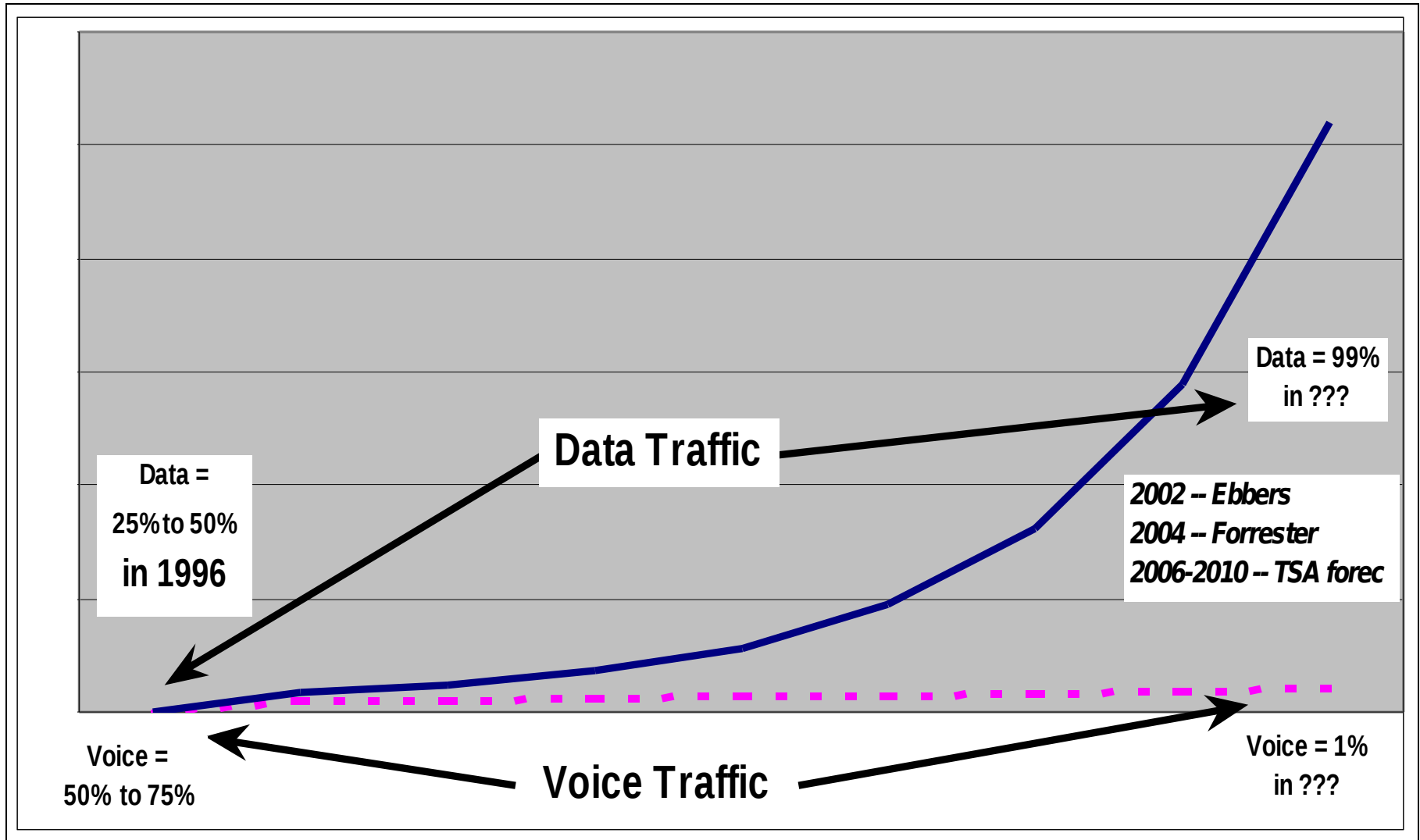
Source: Telecoms @ The Internet II, William Marmon, Executive Director, Ventures & Alliances, MCI Communications Corporation, October 30, 1996 and IGI FOWU 12-19-97, p3--" ...580 Tbytes of data..each month..."

- Accelerating Shift from Voice Dominance to Data

Source: AT&T



Gauging the Opportunity



Prognostications → Market Implications

1. Data continues to grow at historical rate of Internet:

Trendline: 85% per year

Market Impact: ~500 Gbps demand in 2005
(67X 1997)

2. "voice will fall to less than 1% of the total by 2004."

--Gilder, quoting Forrester Research in WSJ, 10-6-97, re. WorldCom/MCI deal

Implied Data CAGR: 121% per year

Market Impact: ~2.0 Tbps demand in 2005
(275X 1997)

3. "...by 2002, voice will be less than 1% of telecom traffic."

--Ebberts quoting unnamed "analysts" in WSJ, 9-9-97, re. WorldCom/ANS deal

Implied Data CAGR: 190% per year

Market Impact: ~17.8 Tbps demand in 2005
(2400X 1997)

Prognostications → Market Implications (continued)

4. "In the US, estimates (for Internet bandwidth growth) range from 10% per month to tripling every quarter."

--J.F. Mergen, GTE Internetworking, Newport Conference on Fiberoptics Markets, 10-22-97

Implied Internet CAGR: 314% per year

Assumption: If Internet is 10% of all data traffic

Market Impact: ~31 Tbps demand in 2005
(4,000X 1997)

5. Internet backbone traffic growing 15% per month:

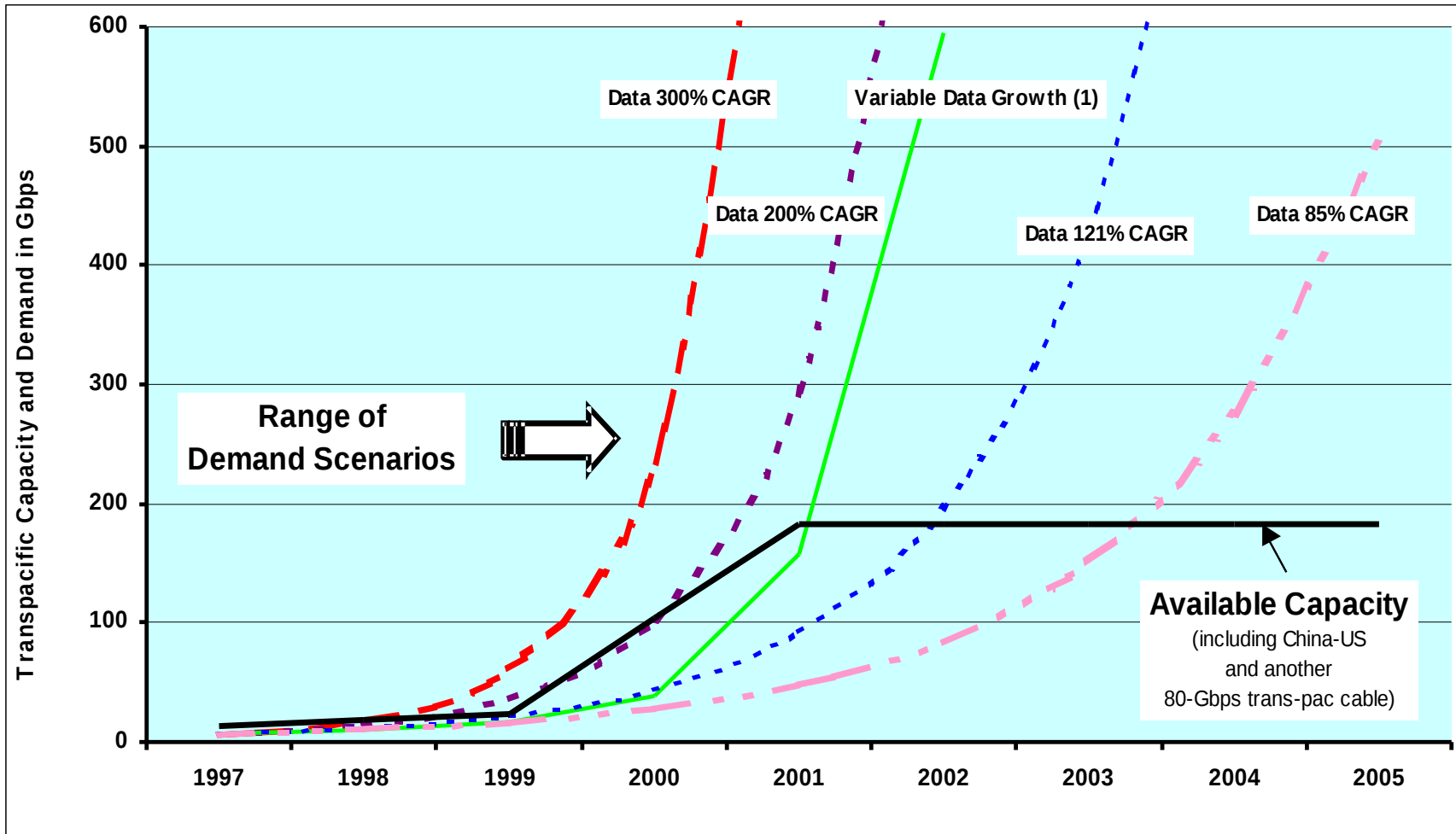
--MCI web site, 1997

Implied Internet CAGR: 435% per year

Assumption: If Internet is 10% of all data traffic

Market Impact: ~234 Tbps demand in 2005
(31,000X 1997)

Impact on Transpacific Demand Forecast

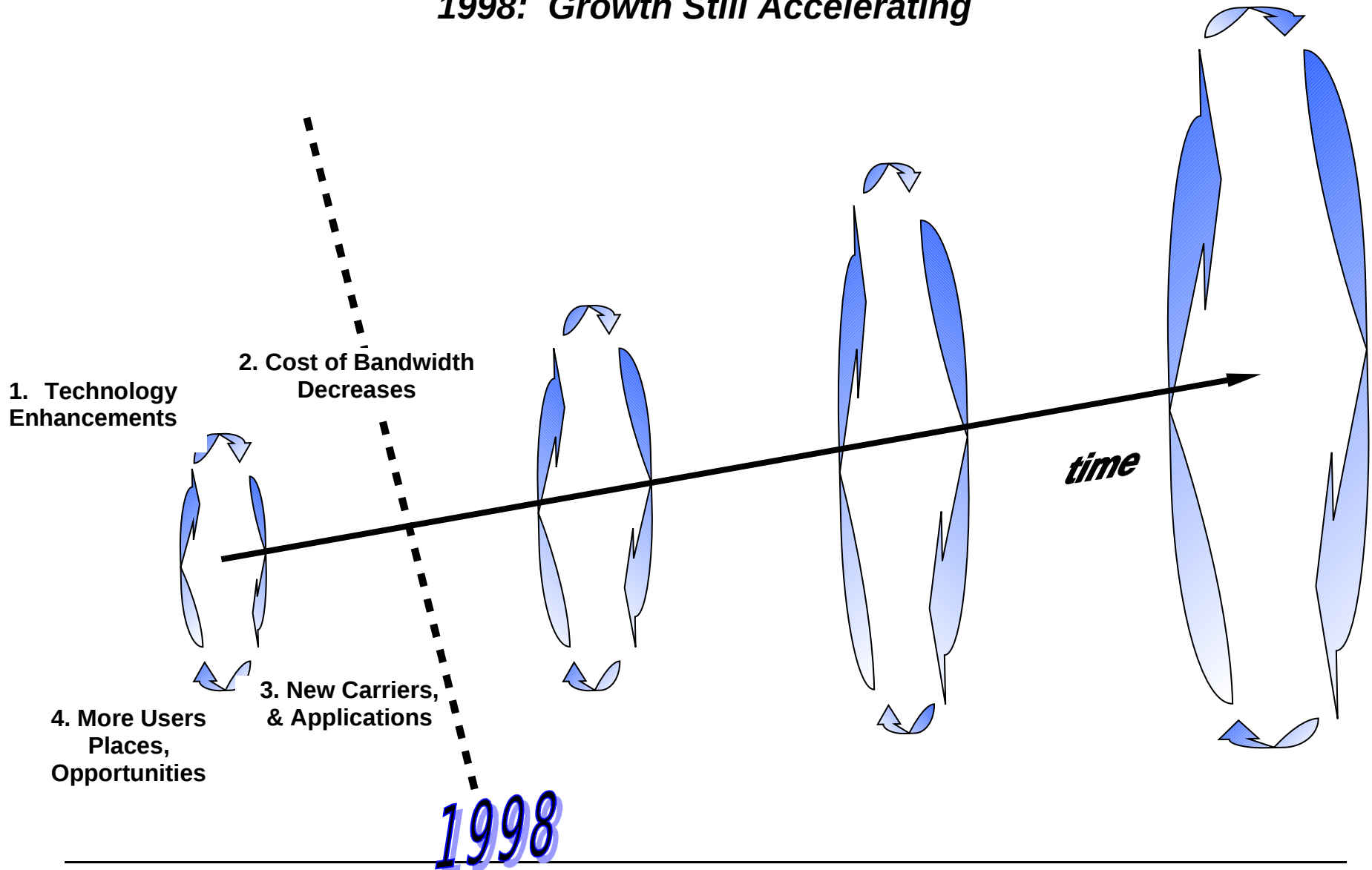


Summary & Conclusions

- Technology continues to enable decreasing bandwidth costs
- Demand for circuit capacity has lead to innovations in ownership structure and in terms and pricing for bandwidth
- Carriers have many more choices and options available to meet customers' demands in the near future
- New industry environment will continue to attract new entrants as well as promote development of new applications

Expanding Cycle of Bandwidth Demand Over Time

1998: Growth Still Accelerating



Summary & Conclusions (continued)

In this economy, our ability to create wealth is not bound by physical limits, but our ability to come up with new ideas -- in other words, it's unlimited.

*--the editors, Wired, State of the Planet 1998,
January, p.173*

TSA BACKGROUND

T Soja & Associates (TSA) was founded in 1997 as a consultancy specializing in the analysis of market opportunities in international and domestic telecommunications systems, technologies, and businesses. TSA's founder, Mr. Thomas A. Soja, is a recognized leader in the fiberoptic submarine telecommunications systems industry.

TSA's primary mission is to serve the growing need for accurate, reliable, and independent market analysis of telecommunications systems for telcos, investors, systems developers, and suppliers. The cornerstone of that activity is the analysis of regional, transoceanic, and domestic submarine cable systems and traffic worldwide. TSA is continually in touch with international telecom authorities and operating company representatives throughout the world as part of its ongoing pro-active market analysis and information gathering activities.

THOMAS A. SOJA

In his former position as senior analyst and director of submarine cable studies at KMI Corporation, Mr. Soja conducted feasibility and market demand studies for projects such as:

- Atlantic Crossing (AC 1)--Global Crossing Ltd.; AC-1 is the first independent investor-owned carriers' carrier submarine cable,
- Hawaii-Americas (HIAM) and Western Hemisphere (WH) submarine cable systems--GST International,
- Global West coastal-US festoon--Global Photon Systems Inc.,
- Trans Pacific Cable Network (TPCN)--Korea-Japan-US initiative,
- Afrilink coastal festoon system in West Africa-- Siemens AG,
- and several other terrestrial fiberoptic networks in the US.

Mr. Soja has written many articles on the fiberoptics and submarine cable industry. His work, byline, and opinions have been sought for more than a dozen publications worldwide, including: Lightwave, Communications Week International, Telecommunications, Wire Journal International, The New York Times, Exchange, Telenews Asia, tele.com, Der Spiegel, Photonics Spectra, Money On-line, Pacific Telecommunications Profile, Laser Focus World, Asian Communications, Wired, and the investment banking community. He has provided numerous industry briefings on a variety of fiberoptics and international telecom related markets to clients worldwide.

Mr. Soja is a member of the New England Fiberoptics Council, a member of the SPIE's International Technical Working Group on Fiber Optics. Mr. Soja has recently chaired the Forecasting and Finance session of the Submarine Networks 1998 conference (London, Centre for Eurotelecoms) and is helping to organize the first Pan American Submarine Fiber Optics Communications Systems conference (AIC Conferences, New York) that will be held in Orlando, Florida (June 1998.) TSA is a member of the Pacific Telecom Council (PTC.)

JOHN MANOCK

John Manock, TSA's Information Services Manager, has 10 years of experience in the fiberoptics and telecommunications consulting business. Mr. Manock directs TSA's Submarine Cable News Service providing focused daily deliveries of late-breaking news and events that shape the industry. Mr. Manock continually updates TSA's systems and news databases with timely information and publishes summaries each month.

Formerly with KMI Corporation, Mr. Manock participated in the Afrilink, AC-1, HIAM, and WH feasibility studies. Mr. Manock was responsible for creating and maintaining the worlds most comprehensive and up-to-date database on fiberoptic submarine communications systems. He also prepared numerous studies on the CLEC and long distance markets in the U.S. and on fiberoptic markets in developing parts of the world.